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Pacific Southwest Region

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3420 Biological Evaluation
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AN EVALUATION OF DIE-OFF OF BITTERBRUSH AND SAGEBRUSH ON RANGE LANDS IN NORTHEASTERN CALIFORNIA

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ABSTRACT

Die-off of antelope bitterbrush and big sagebrush was evaluated on deer habitat rangeland near Susanville, California. Management alternatives are discussed.

INTRODUCTION

On August 24, 1988, the Deer Habitat Review Team, along with two Forest Service entomologists, Pat Shea, Pacific Southwest Forest and Range Experiment Station, and Dennis Hart, Forest Pest Management, met to evaluate the die-off of antelope bitterbrush, Purshia tridentata, on 5,000 acres of land administered by the Bureau of Land Management east of Ravensdale, 50 acres near the Bass Hill Dump Site, administered by the California Department of Fish & Game, and the die-off of big sagebrush, Artemisia tridentata, on 1,000 of land at Deep Cut, administered by the BLM.

Antelope bitterbrush is the preferred food source of deer on their transition range -- a portion of the deer range that is critical for deer herd survival on public lands. Because of the rapid die-off of this critical browse plant, only smaller deer herds can be maintained each year. In 1987 more than 1/3 of 3,800 deer died. Continued decline of bitterbrush range will make survival even more difficult.

This report summarizes the results of this evaluation and presents management alternatives for the bitterbrush die-off in the Ravensdale area.

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OBSERVATIONS

Ravensdale. The bitterbrush die-off near Ravensdale is related to the old age of these stands.

Bass Hill Dump Site. Only bitterbrush over some 50 acres is dying-off in one concentric zone. The edge of this zone is progressing up hill near the dump site along a 300 yard strip, and the area is expanding at the rate of about 10 acres per year. Although plants along the upper edge of this zone continue to die through the year, most the the die-off appears to occur during the winter and early spring. There is a narrow strip dividing the living and dead plants. This strip is about 5 yards wide and 300 yards long. The foliage color within this strip is varying shades of yellow, from light-cream to a dark orange yellow. All of the dead and dying bitterbrush plants are severely desiccated.

Root and foliage samples were collected from this and the other areas, and analyzed by plant pathologists for disease. No indicators of plant disease were observed. It is highly improbable that insects or disease could cause this amount of damage over such a short period of time without leaving residues of their activity on the affected plants. I suspect some form of abiotic condition such as winter drying, and/or chemical damage caused this die-off. If chemicals are involved, their residues can be detected through soil samples.

Desiccation caused by winter drying occurs when the soil is still frozen and there is little snow on the ground. Warm winds under these conditions can cause severe desiccation to plant tissues. This type of damage can be very severe on sandy soils, which are common in this area, because these soils can only carry small amounts of water and rapidly dry out. This condition is very critical in areas of shallow soil overlying rock, or porous gravel.

Deep Cut. The die-off of big sagebrush at Deep Cut is adjacent to Mudd Lake. Following the 1976-1978 drought there were three years of heavy moisture when Mudd Lake was very deep and covered much of the lower areas where die-off is now occurring. I am not sure what is causing the sagebrush die-off in this area, but feel that widely flucuating soil moisture conditions may have caused injury to the root systems of the affected plants.

MANAGEMENT ALTERNATIVES

Ravensdale Area

1. Continue Current Management Direction.

   Under this alternative the carrying capacity of the transition range will continue to decline each year.

2. Burn and Regenerate Bitterbrush

With this alternative, the carrying capacity of this transition range will be greatly reduced for the ten-year period it will require for bitterbrush to be reestablished. During this ten-year period, the range should be maintained by planting bitterbrush for the deer herd to feed on.

Burning can severely damage antelope bitterbrush, but light burning when the soil is moist enhances sprouting. Best results have been obtained during the spring following rain while the soils are moist and rains continue following treatment.

3. Rolling

Rolling bitterbrush with a heavy log covered with rubber tires and pulled with a rubber-tired tractor shows promise. This treatment should follow seed set. Although there was little response the first year after rolling, on a project in California, bitterbrush leader growth averaged 54% greater than that on the control area the second year, and most of the plants showed excellent vigor. As yet, long-term evaluation of this method has not been made.

4. Prunning

Prunning back the bitterbrush plants to 18 to 24 inches in height, using chain saws fitted with bow-bars, promotes good sprouting. This method is very time consuming, labor intensive and expensive.